#2337

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R-10

REPLY TO: 5230 Evaluation

December 4, 1972

SUBJECT: Hemlock Sawfly and Blackheaded Budworm

TO: Forest Supervisor, South Tongass N. F.

Enclosed is an evaluation report concerning hemlock sawfly and blackheaded budworm activity on the Ketchikan Ranger District. Included is a map showing the location of the various infestations in the Ward Creek and Whipple Creek drainages.

The evaluation report is an appraisal of the likely course this outbreak will take if unchecked and the damage and loss that might be expected if the outbreak is not suppressed.

The sawfly caused defoliation in 1969, 1970, and 1971, but damage was not severe. In 1972, sawfly populations caused severe defoliation in the area near Ward Lake. Some trees are dying and some are being topkilled. As of October 1972, there is a sizable sawfly egg population present in the area, and more damage can be expected to occur in 1973. Although it is expected that starvation, parasites, and disease will reduce the population at Ward Lake next year, additional damage could occur beforehand, and the population could spread.

A saddle-backed looper population caused some defoliation near Connell Lake in conjunction with the hemlock sawfly, but the looper population collapsed in 1969. Since then it has been in the area at an endemic level and currently does not pose a threat.

The concern with the budworm is that it has been increasing in the area near Ketchikan for the last two years, although no defoliation noticeable from the air has yet occurred. Significant numbers of budworm eggs were found at Ward Lake during the biological evaluation of the sawfly infestation. The budworm is potentially a more damaging insect. If the summer of 1973 is warmer than normal we can expect both the sawfly and the budworm to cause more damage than has occurred so far.

Of our commonly recognized multiple uses, two are subject to the effects of defoliation near Ward Lake. They are timber and recreation-esthetic values. Seemingly available insect management alternatives near Ward Lake include:

1. Utilization of commercial timber by harvest of some of the dead and imminently threatened trees.

2. Enhancement of recreation and esthetic values by suppression.

3. Utilization of some dead and imminently threatened timber plus enhancement of recreation and esthetic values by direct suppression.

4. No direct measures to utilize imminently threatened timber or to suppress insect populations by direct measures. Population and tree impact assessment would continue.

5. Small scale field experimentation of a candidate insecticide to suppress either the sawfly, the budworm, or both.

The following is a discussion of these seeming alternatives.

1. Utilization. The population dynamics of the sawfly and the budworm preclude tree harvest as an effective population control factor unless the entire infested area of concern could be harvested. An insect population reduction in the uncut stand will not result from limited harvest because of remaining infestation sources both within the uncut stand itself and in the surrounding host type. The primary benefit of commercial harvest is the utilization of trees, at locations other than developed recreation sites, that might otherwise be lost or top-killed.

2. Suppression. Measures of reducing defoliator populations may include introduction of parasites, predators, or pathogens; attempts at stand manipulation; insecticide application; and ideally, an integration or combination of these factors.

Introduction of parasites, predators, or pathogens is contingent upon careful selection and rearing or culturing of beneficial organisms. Although considerable work is being done by the Forestry Sciences Labortory on taxonomy and biology of defoliator parasites, the wheels are not in motion for us to introduce organisms against the sawfly or budworm. Such organisms do exist in the field, however, and eventually they will contribute to the decline of the pest insect outbreak.

Stand manipulation in the Ward Lake situation consists of silviculturally modifying the host stand. Aside from outright harvest, no silvicultural manipulation methods have been established for the sawfly or the budworm.

Chemical insecticide application can reduce pest insect populations and thereby minimize the tree mortality, top-killing, and growth loss that reduce both commercial timber and recreation values. There are, however, no chemicals currently registered by EPA for use against the sawfly or the budworm on an operational basis. Prerequisite to Federal registration and operational use is a stepwise progression beginning with laboratory screening of likely compounds followed by small scale field experimentation. The next step involves pilot testing of one or two of the most likely formulations of a chemical that has satisfactorily proven itself in the laboratory and in field experiments. In addition to scientific evidence of a chemical's effectiveness against the target insect(s), laboratory and field data must confirm a chemical's relative environmental safety to nontarget organisms and other ecosystem components.

A decision to use a registered chemical on a Federally funded project must then be based upon:

1. A meaningful biological evaluation to determine the significance of an insect outbreak, its probable course, and the damage that can be expected with or without suppression.

2. A cost/benefit evaluation to weigh the cost of suppression and adverse effects aginst the values saved as a result of suppression.

3. An environmental evaluation to determine adverse impacts from the suppression method planned for use, the measures required to hold these impacts to a minimum, and consideration of alternatives, including the impact of inaction. Recent Forest Service experience indicates that a comprehensive environmental statement would be needed on such a project in order to comply with the National Environmental Policy Act of 1969.

The biological evaluation has been completed. The cost/benefit and environmental evaluations could best be completed cooperatively by the Forest, Insect and Disease Control, Forestry Sciences Laboratory, and the various Federal and State fish and game management agencies who would be involved in carrying out the project or in monitoring for potential side effects.

Such a project would have to be reviewed by the Regional Pesticide Use Coordinating Committee, approved and then forwarded to the Washington Office for final review and approval by the Interagency Working Group on Pesticides. Funding for such a project would be acquired from a Regional Pest Control reserve by submitting a Project Proposal form 5200-10 and required evaluation to the Regional Office.

The above sequence of events leading up to chemical suppression is presently limited at the field experimentation stage. Therefore, chemical suppression on an operational basis at Ward Lake is not a viable managment alternative.

3. Utilization and Suppression. While utilization could effectively capitalize on an imminent timber loss, it would not protect uncut trees valued for recreation. For the reasons stated in 2. above, chemical treatment is not feasible.

4. Inaction. Tree mortality to date is between one-fourth and one-third of the hemlock, based on existing plot data. Top-killing is 6 percent in dominant hemlock and 2 percent in codominant hemlock sampled. Unpublished data 1/ indicate that severe defoliation of hemlock by the blackheaded budworm can result in permanent tree damage to 42 percent of trees above 11 inches d.b.h. That percentage consisted of 14 percent tree mortality, 5 percent one-half top-killing, and 14 percent one-quarter top-killing. The green stand before damage occurred contained 42 trees per acre over 11 inches d.b.h. Stand impact data for spruce is less available.

Mortality and top-killing by the sawfly and budworm cannot be accurately predicted for the Ward Lake area. We do not expect that tree dying will result in any major reduction in stand value for recreational or esthetic purposes. Some merchantable volume loss will be realized.

5. Chemical Field Experimentation. The Insecticide Evaluation Project of the Pacific Southwest Forest and Range Experiment Station has conducted laboratory screening tests of 13 chemical compounds against the hemlock sawfly and 5 against the blackheaded budworm. Three of the 8 most effective chemicals against the sawfly were Gardona, Zectran, and pyrethrins. Zectran and pyrethrins were among the three most effective chemicals applied against the budworm. Pyrethrins are highly regarded for their environmental safety. Zectran is a relatively safe insecticide of which the Forest Service has a good supply in possession.

The upshot of this discussion is that Ward Lake offers a prime opportunity to test on a small scale an insecticide that could then be pilot tested and that may be useful in high-use areas if the budworm increases on the South Tongass as expected. Our greatest constraint in conducting a test in 1973 is available entomological staff required to plan and execute a well-designed, conclusive test. In short, our insect and disease control staff has other high priorities to which it must also address itself.

Conclusion. I suggest that you carefully weigh the benefits of utilization harvest in part of the infestation against any possible adverse impacts that cutting might have on nearby recreation values. Whether or not harvest is conducted, we can expect some additional defoliation, mortality, and top-killing near Ward and Connell Lakes. While recreational

1/ Downing, G. L. 1957. Western hemlock damage caused by the blackheaded budworm - Appraisal survey, Thayer Lake, Admiralty Island, Alaska. U.S.F.S. Alaska Forest Research Center, March 1957. 7 pp. plus attachments, unpub.

values may be adversely affected by tree damage, the host stands and the recreation sites will endure.

In brief, where harvest affects recreation values, we must balance the annual recreation use in dollars against the value of wood fiber utilized when it is averaged over the rotation period. If harvest can be conducted far enough from recreation sites, cutting and recreation become mutually exclusive.

At the earliest possible time, our entomological staff will take advantage of the Ward Lake or other similar opportunity to test a candidate insecticide. There are some possible means of augmenting our Regional Insect and Disease staff enough to conduct a chemical field experiment. We will explore these possibilities. In the meanwhile, we will continue to monitor both the pest insect population levels and the tree injury and resultant economic damage caused by the budworm and sawfly.

"for" R. E. Lockhart

C. A. YATES
Regional Forester

Enclosures

cc: RF

BHBaker:brm

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# FOREST SERVICE

SADDLE BACK LOOPER INFESTATION
COUNCIL [illegible]
Ketchikan Ranger District
1969-1972
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